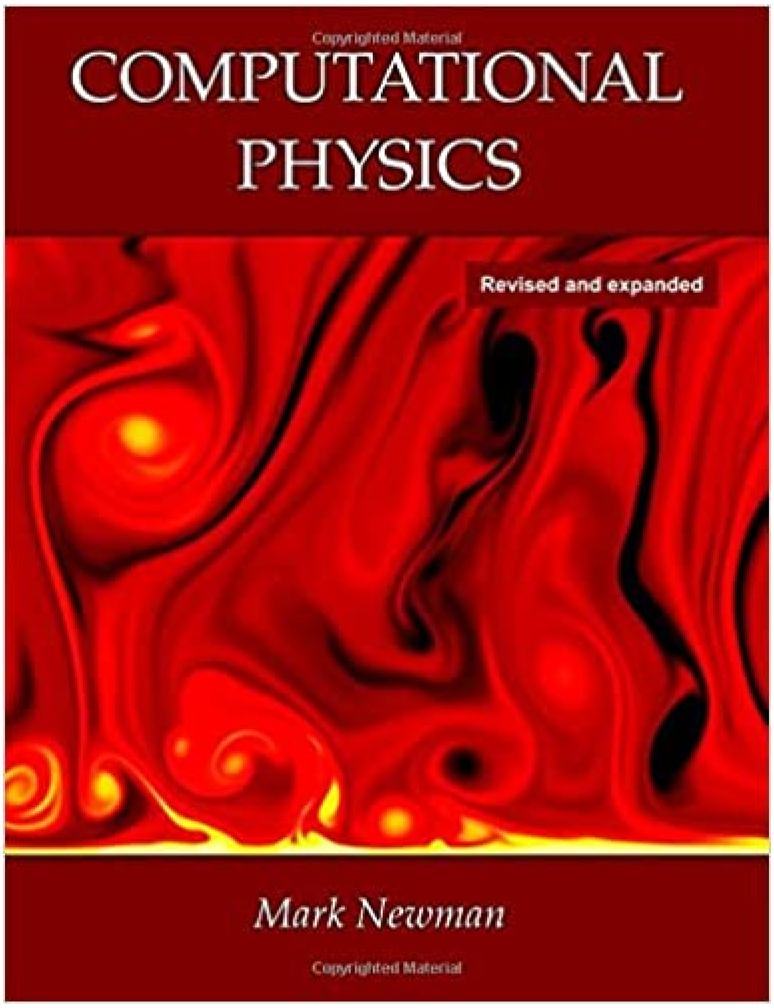
Computational Physics



Synopsis

A complete introduction to the field of computational physics, with examples and exercises in the Python programming language. Computers play a central role in virtually every major physics discovery today, from astrophysics and particle physics to biophysics and condensed matter. This book explains the fundamentals of computational physics and describes in simple terms the techniques that every physicist should know, such as finite difference methods, numerical quadrature, and the fast Fourier transform. The book offers a complete introduction to the topic at the undergraduate level, and is also suitable for the advanced student or researcher who wants to learn the foundational elements of this important field.

Book Information

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Customer Reviews

This is an incredible book for a first timer. It gives a very good introduction to the Python language and how to apply aspects of it to solving Physics problems.There are a few minor issues with the book (Not worth rating it lower than 5 stars). Dr. Newman will introduce libraries and not explain some of them, such as gaussxw. These are usually libraries and functions on the book website. However, there is no reference to it in the book when introduced. Minor oversite. Another issue is that there are parts of the book where it appears he didn’t pay attention to which values he was using.These are types of issues that I am sure will be fixed in later editions. Overall this is an incredible book. I picked up this book to see what it had to say. It has taught me things that I did not know. I love that!

I am a mathematician with some basic programing experience and I was interested in learning

Python mostly for mathematical and educational purposes. I consulted many Python books, but I find myself returning over and over again to Chapters 2 and 3 of this book. If you are new to Python and you are interested in scientific applications this is in my view the best place to start.

I'm a novice Python programmer, but yet I find this book very accessible, well-structured, clearly written, and comprehensive. I am only about halfway through this book but feel that it has really helped me learn both Python programming and solid numerical analysis skills. My only warning is that without a strong physics background the examples and problems may be a bit opaque, but with a strong physics background this book does an excellent job of connecting the physics with computational techniques.

An excellent book for introductory programming for physics students, yet a great addition to any physicist's personal library. It does a really great job at presenting physics and the code involved - possibly the most well presented in terms of code. I've read countless books where the code looks disorganised and, in some cases, riddled with errors/bugs. The book also encourages the reader to try examples throughout each chapter instead of lumping together a whole pile of chapter problems at the end of the chapter - I cannot stress how convenient this style is,in that it prompts the reader to try push for a solution before reading on, and saves one from having to thumb back through the chapter for relevant equations.My only qualms about this book are that, while the concepts and problems are themselves challenging to the physics enthusiast, there is not enough material on stochastic methods, particularly with Markov Chain Monte Carlo, which is has fast become a staple technique in statistical analysis or modelling for any budding physics researcher; the idea of object oriented programming (python being itself object oriented) is completely cast aside which, I am told, is somewhat of a crime in the eyes of the python aficionado; and there seems to be no e-book version provided with the purchase - something that I would much rather prefer as it encourages one to code while reading it.That being said, the book presents exactly what it promises: computational methods and concepts in physics, does so very neatly without insulting the reader's intelligence. I highly recommend this book to those only beginning python/programming and are enthusiastic about physics. It is a much more fun and challenging introduction to the language than the official Python tutorials and other textbooks that may focus on presenting you with rigorous overview of the Python language that can become boring and cumbersome.

As Eric Ayars said, there are a lot of good books about Python, a bunch of good books about computational physics but we gota lack of book about comp. phys. using Python 3. That's the one and it's a real good one. I got only a suggestion: more practical exercises but, you know, if you buy this book you've advanced in this subject a lot of the road probably...

This book teaches Python with examples from physics. I think it is the only python book specifically targeted to physics majors and physicists. The author actually makes available for free a big part the book, but if you need all of it, the best thing is to just purchase it.

Great text that covers essential concepts such as derivatives, integrals, ODES, PDE's. What I enjoy about this text is that it focuses on generalities and therefore has been of great use to me in writing algorithms for my own research. Would highly recommend to those folks who want to explore computational/physical/mathematical research/projects.

I absolutely love the physics in this book and it does a great job presenting a lot of the python concepts you will need to do amazing things. My only gripe is that it completely blows off object oriented principles and their benefits which is a crime. You will want to learn more about OO for larger scale and maintainable applications as you do more. Aside from that it is very well written and a pleasure to read and work with.

Lectures on Theoretical Physics (Cambridge Monographs on Particle Physics, Nuclear Physics and Cosmology) Six Ideas That Shaped Physics: Unit R - Laws of Physics are Frame-Independent (WCB Physics) Problem-Solving Exercises in Physics: The High School Physics Program (Prentice Hall Conceptual Physics Workbook) Computational Physics Basic Concepts in Computational Physics For the Love of Physics: From the End of the Rainbow to the Edge of Time - A Journey Through the Wonders of Physics Quantum Physics: Beginner's Guide to the Most Amazing Physics Theories 5 Steps to a 5 AP Physics 1: Algebra-Based 2018 edition (5 Steps to a 5 Ap Physics 1 & 2) Barron's AP Physics 1 and 2 (Barron's Ap Physics B)